

universe

J e t P r o p u l s i o n L a b o r a t o r y

October 11, 2002
Volume 32 Number 21

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MARS

NASA HAS RELEASED THE FIRST SET OF DATA

taken by the Mars Odyssey spacecraft to the Planetary Data System, which will now make the information available to research scientists through a new online distribution and access system.

"This release is a major milestone for Mars scientists worldwide, since the first validated data from our instruments are now available to the entire scientific community," said Odyssey Project Scientist Dr. R. Stephen Saunders of JPL. "There are fundamentally new kinds of information in these data sets, including day and night infrared images, maps of hydrogen in the soil, and radiation hazard data for future Mars missions."

The information includes the first six weeks of mapping data through the end of March, as well as the observations made during the cruise phase to Mars. The archive consists of formatted instrument data from the gamma-ray spectrometer and high-energy neutron spectrometer; Mars maps from the neutron detectors; about 800 visible and infrared images taken by the camera system; and radiation measurements from the Martian radiation environment experiment. New data will be released to the science community every three months.

The Odyssey data are available through a new online access system established by the Planetary Data System at <http://starbrite.jpl.nasa.gov/pds>.

The Odyssey data release, coupled with the availability of this new system, marks a significant improvement in access to data from solar system exploration missions. Now, validated data from all Odyssey instruments will be available for search and retrieval immediately upon delivery to the Planetary Data System.

THE SYSTEM will soon integrate data sets from all Mars missions so researchers can obtain all the data they need at a "one-stop shopping" Internet site. A guide to the Odyssey data sets can be found at the Planetary Data System geosciences node at <http://wufs.wustl.edu/missions/odyssey>.

JPL manages the 2001 Mars Odyssey mission for NASA's Office of Space Science. Investigators at Arizona State University, the University of Arizona and NASA's Johnson Space Center, Houston, operate the science instruments. Additional science partners are located at the Russian Aviation and Space Agency and at Los Alamos National Laboratories, New Mexico. Lockheed Martin Astronautics, Denver, is the prime contractor for the project, and developed and built the orbiter. Mission operations are conducted jointly from Lockheed Martin and from JPL.

Additional information about Mars Odyssey is available online at <http://mars.jpl.nasa.gov/odyssey>.

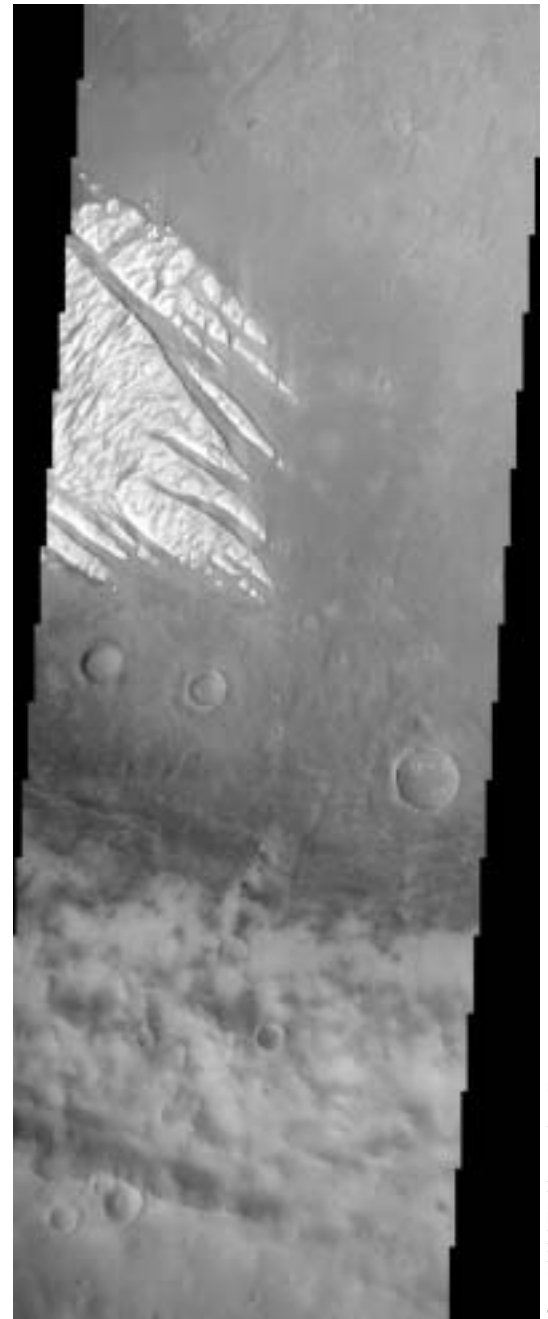


Photo: NASA / JPL / Arizona State University

Odyssey releases first data archive

By Mary Hardin

Mars Odyssey image shows the "White Rock" feature in visible wavelengths. The image was acquired simultaneously with infrared images on March 11, 2002. This unusual landform was first observed during the Mariner 9 mission in the early 1970s.

New center will help in technology transfer

By Carolina Martinez

Guests Chris Hughes (left) of HighTower Software and Jim Davidson of E-Views Safety Systems chat during the dedication of JPL's Commercialization Center Oct. 4.

Many technologies developed at JPL have skyrocketed on Earth due to strategic business alliances.

And on Friday, Oct. 4, the grand opening of JPL's Commercialization Center created a one-stop shop for U.S. companies that would like to work with JPL's Commercial Technology Program to develop and transfer technologies for public use.

"It will literally be the front door to companies who wish to work with us but who don't



Photo by Bob Brown / JPL Photolab

know quite where to go," said Merle McKenzie, manager of the Commercial Technology Program at JPL. "The Commercialization Center will provide access to information on JPL's unique capabilities and technologies, exper-

tise, research and development and services geared toward business."

On average, JPL reports nearly 300 innovations per year and roughly 150 new business partnerships.

"JPL is one of the special institutions that make this region different," said Jack Kyser, senior vice president and chief economist of the Los Angeles Economic Development Corporation. "JPL is on the cutting edge of space exploration and expands our overall knowledge of technology that makes all our lives better."

JPL Deputy Director Eugene Tattini gave the keynote address for the opening, and the Lab's chief technologist, Dr. Erik Antonsson, moderated a panel on partnering experiences featuring representatives from companies that have collaborated with JPL, including Boeing, PhotoBit, E-Views Safety Systems and Dubbs & Severino. A networking reception allowed participants to learn more about the ins-and-outs of working with JPL to commercialize a technology.

The Commercialization Center will be the gateway to the following programs and opportunities for businesses:

LICENSING JPL TECHNOLOGY The Caltech Office of Technology Transfer is responsible for the

licensing and transfer of technologies from Caltech and JPL. In 2000, more than 120 patents were issued to Caltech.

TECHNOLOGY AFFILIATES Any U.S.-owned organization can access JPL's special technological expertise and specialized equipment through the Technology Affiliates Program. This program is structured to provide technology transfer and customized help for developing new or improved products and manufacturing processes, where JPL does not compete with U.S. industry.

TECHNOLOGY COOPERATION AGREEMENTS These agreements create dual-use technology development arrangements with no exchange of funds. JPL and its partner company leverage each other's intellectual property and expertise for NASA goals and commercial use.

SMALL BUSINESS TECHNOLOGY TRANSFER This program provides funding, on a competitive basis, to small businesses interested in undertaking research and technology development, on the topics of interest identified by five U.S. Government agencies.

More information about the Commercialization Center is available at http://techtransfer.jpl.nasa.gov/index_flash.html.

News Briefs

The Mid-Infrared Large-Well Imager recently imaged the center of the Milky Way Galaxy (right) and the image at left (below). A Hubble Space Telescope image of Jupiter's north pole is shown at right.

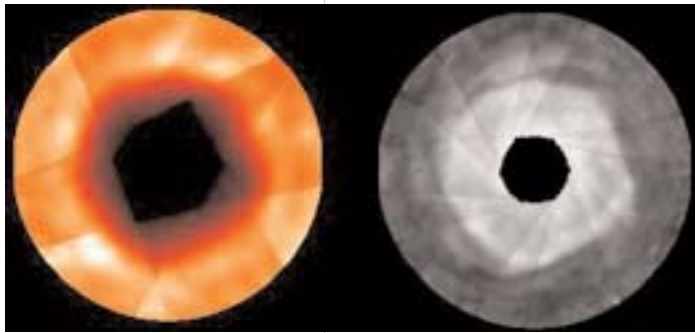
Infrared camera eyes galaxy, Jupiter

The JPL-built Mid-Infrared Large-Well Imager on NASA's Infrared Telescope Facility has produced significant new images showing the center of our Milky Way galaxy and a cold vortex over Jupiter's north pole.

The camera, located at the Keck II telescope in Hawaii, provided the highest resolution mid-infrared picture ever taken of the center of the Milky Way, revealing details about dust swirling into the black hole that



dominates the region. The camera's Jupiter images, used in composite with Hubble Space Telescope images, showed that Jupiter's vortex in the upper atmosphere over its north pole resembles the vortex over Earth's south pole that enables depletion of Earth's stratospheric ozone.



The Milky Way image was taken by a team led by DR. MARK MORRIS of UCLA. The camera used three different infrared wavelengths to build the color composite image available online at <http://iraastro.jpl.nasa.gov/GalCen/galcen.html>.

The mid-infrared part of the electromagnetic spectrum comprises the wavelengths at which room temperature objects glow most brightly. Seeing celestial objects through this glow is like trying to see stars during daylight; special techniques are

needed to tease the stars from this glow to build a recognizable picture.

Near the center of the image, but not apparent at these wavelengths, is a black hole 3 million times heavier than our Sun. Its gravitational pull, so powerful that not even light can escape from its surface, affects the motion of dust, gas, and even stars, throughout the region.

Composite versions of the Jupiter images, which resemble cats' eyes, were presented last week by JPL astronomer DR. GLENN ORTON at the annual meeting of the American Astronomical Society's Division of Planetary Sciences, in Birmingham, Ala.

A cold air mass, which maintains a roughly hexagonal shape, extends vertically from Jupiter's stratosphere down into the next-lower layer of the atmosphere and rotates at a rate that takes about 300 days to complete a full circle. Scientists can refine models of how Earth's atmosphere works by comparisons with atmospheric dynamics on other planets, such as Jupiter.

The images are available online at <http://photojournal.jpl.nasa.gov/catalog/PIA03864>.

Uncrewed vehicles conference set

NASA Ames Research Center will host a workshop on uncrewed air vehicles on Oct. 29-30 in Palo Alto.

"Applications, Concepts and Technologies for Future Tactical UAVs" will present emerging technologies and future systems concepts, and will discuss development and evaluation of uncrewed air vehicle system design (not the air vehicle itself) and application criteria.

Guidance will be provided on future directions in tactical system architectures, mechanization and technologies, pertinent system design considerations, trade-offs and alternatives for exploiting the full potential of uncrewed air vehicles.

A block of rooms has been held for participants. To reserve a room, call the Crowne Plaza Cabana Hotel at (888) 422-2264, ext. 114/157 before Oct. 18. After this date, availability and rate cannot be guaranteed. Mention the "NATO Lecture Series" to receive the government rate of \$150 per night.

Registration is due by Oct. 18. Contact MARCIA REDMOND at mredmond@mail.arc.nasa.gov for more information.

Although construction on JPL's Optical Interferometry Development Lab was just completed last month and the facility is not yet occupied, the new Building 318 has already reaped substantial rewards for the Lab.

For installing energy-efficient equipment in the new structure, JPL was presented with a rebate check of \$48,276 last week by Southern California Edison.

Larry Reynolds, Edison technical specialist for new construction services, said the award was given under the utility's "Savings by Design" program, offered to commercial and industrial customers as a one-time incentive to install energy-efficient equipment. He said the energy savings will be realized through the installation of variable-frequency drives on pump motors and air handler motors, which handle the building's air conditioning and heating systems. The drives work to vary

the amount of load during different types of demand.

Reynolds added that the energy-efficient systems could save JPL more than \$30,000 annually in energy costs.

The new laboratory, which is located across from the credit union, will be dedicated to interferometry experiments in the Origins Program.

The building began construction in June 2001 and is expected to be fully operational by early next year. A dedication ceremony is scheduled for Monday, Nov. 4, at 1:30 p.m.

Energy savings nab Lab a cool \$48K

By Mark Whalen



From left, Fred McNutt, JPL director of Business Operations and Human Resources; Carl Simon, Building 318 construction project manager; Mike Anthony, Edison account executive; and Larry Reynolds, Edison new construction services.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meetings are available. Call the Employee Assistance Program at ext. 4-3680 for time and location.

Caregivers Support Group—Meets the first Thursday of the month at noon in Building 167-111 (The Wellness Place). For more information, call the Employee Assistance Program at ext. 4-3680.

Codependents Anonymous—Meeting at noon every Wednesday. Call Occupational Health Services at ext. 4-3319.

Gay, Lesbian and Bisexual Group—Meets the first and third Fridays of the month at noon in Building 111-117. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at ext. 3-0664.

Working Parents Support Group—Meets the third Thursday of the month at noon in Building 167-111 (The Wellness Place). For more information, call the Employee Assistance Program at ext. 4-3680.

Friday, October 11

Folk Music—Singer/songwriter David Mallett will appear at 8 p.m. in Caltech's Dabney Lounge. Tickets are \$15 for adults and \$5 for children under 12. For information, call (626) 395-4652 or log on to <http://www.folkmusic.caltech.edu>.

Saturday, October 12

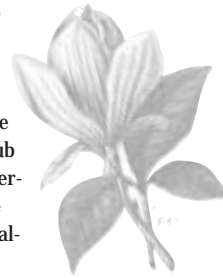
The Reduced Shakespeare Company—The great literary works of the world are condensed into only two hours, beginning at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$29, \$25 and \$21, youth high school age and under, \$10. For more information, call (626) 395-4652.

Sunday, October 13

Chamber Music—The Takacs String Quartet will perform at 3:30 p.m. in Caltech's Beckman Auditorium. Tickets are \$29, \$25, \$21 and \$17. For information, call (626) 395-4652.

Wednesday, October 16

Caltech Women's Club Fall Gathering—New and returning members are welcome to sign up for club events. The gathering is held in the gardens of the Caltech president's residence from 11:30 a.m. to 1:30 p.m. Lunch is available for \$12.50. For more information, call Andree Helou at (626) 798-2327.



Thursday, October 17

Sally Ride—The former astronaut will give a talk at 4 p.m. in Caltech's Ramo Auditorium as part of the Caltech Lecture Series on Achieving Diversity in Science, Math and Engineering. Admission is free. Call (626) 395-4652.



Dr. Sally Ride

Thurs.-Fri., Oct. 17-18



Dr. Michelle Thaller

Von Kármán Lecture Series—"A Billion Suns: The Lives and Deaths of the Stars" will be presented by JPL astronomer Dr. Michelle Thaller on

Thursday in von Kármán Auditorium and Friday in the Vosloh Forum at Pasadena City College, 1570 E. Colorado Blvd. Both lectures begin at 7 p.m. Thursday's lecture will also be webcast live at <http://www.jpl.nasa.gov/events/lectures/oct02.html>, and will be archived online for later viewing. Thaller will discuss how new stars emerge from giant clouds of dust and gas in our galaxy, unravel into nebulae and often die in violent explosions.

Saturday, October 19

Beakman Live—Paul Zaloom as Beakman, the zany, high-energy scientist, uses children and the occasional adult to demonstrate



Paul Zaloom

scientific principles. He will appear at 2 p.m. in Caltech's Beckman Auditorium. Tickets are \$10 for adults, \$5 for youth. For more information, call (626) 395-4652.

Sunday, October 20

Chamber Music—Pianist Christine Azzoni Dow will perform at 3:30 p.m. in Caltech's Dabney Lounge. Admission is free. For more information, call (626) 395-4652.

Wednesday, October 23

JPL Toastmasters Club—Meeting at 5 p.m. in the 167 conference room. Call Roger Carlson at ext. 4-2295 for information.

"The Response to Nicotine"—Caltech biology professor Dr. Henry Lester will lecture at 8 p.m. in Beckman Auditorium. Admission is free. For more information, call (626) 395-4652.

Friday, October 25

Vienna Choir Boys—The choir will perform a program of costumed operettas, sacred songs, and secular and folk music at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$32, \$28 and \$24. For more information, call (626) 395-4652.

Saturday, October 26

Altadena Old Fashioned Day Parade—JPL Director Dr. Charles Elachi is the grand marshal for the annual event, which celebrates the history of the community of Altadena and includes a day-long festival of family fun activities. Starting at 11 a.m. at Santa Rosa and Mariposa Streets, the parade heads east to Lake Avenue, where it turns south and continues to Alameda Street.



POSITIVE SIGNS

JPL Director Dr. Charles Elachi met with employees Oct. 2 to discuss the broader picture within NASA, internal issues at the Lab, and some of the actions that were either taken in the past year or are in the works.

By Mark Whalen

“I think the future for JPL is very, very positive,”

Elachi said. “We have a lot of opportunity over the next decade to tell our successors, ‘Look what we have done,’ and I think this will easily match what our predecessors have done over the last 10 years or 25 years.”

Noting with pride that JPL now has 14 spacecraft operating across the solar system, Elachi lauded the Lab’s accomplishments over the past year and outlined the challenges for FY ’03. SeaWinds is scheduled for launch Dec. 10, followed in the first couple of months of the new year by the Space Infrared Telescope Facility (SIRTF), Galaxy Evolution Explorer and Rosetta instruments; Mars Express instruments in May and Mars Exploration Rovers in May and June.

Department of Defense and NASA,” he said. “Our focus is on doing a technology demo. This will allow a whole new way of doing large telescopes, and will literally put us well ahead of anybody else.”

Additional opportunities will be available under such programs as Scout, Discovery, New Frontiers and Earth System Science Pathfinder. “The message,” Elachi said, “is don’t be afraid of competition—the reward is worth it.”

Elachi also discussed the development of the Lab’s strategic plan, which will be published by the end of the calendar year. JPL’s work is part of the overall NASA vision and mission, which seeks “To understand and protect our home planet, to explore the Universe and search for life, and to inspire the next generation of explorers ... as only NASA can.” From this statement, Elachi explained, flows the JPL mission:

- Explore our own and neighboring planetary systems
- Search for life outside of Earth’s confines
- Further our understanding of and the origins and evolution of the universe and the laws that govern it
- Make critical measurements to understand our home planet and help protect its environment

- Apply JPL’s unique skills to help solve problems of national security and national significance
- Inspire the next generation of explorers

In response to the challenge, Elachi related six new areas of strategic focus, which are equal in importance:

- Scientific and technical excellence
- Business and management excellence
- Strong partnerships
- Contributing to national security
- Our employees
- Public engagement

In addition, there will be 30 initiatives (with a two-year goal) that will address this strategic focus, and 80 specific actions (to be completed within a year).

Section managers and group supervisors will have the opportunity over the next month to provide input to the strategic plan.

Although JPL experienced a significant drop in personnel over the last decade, in the last two years about 320 people have been hired, Elachi said, but “the capacity of the facility is near its limit. The right size for the Lab is in the 5,200 to 5,500 range, even if we acquire new business, and I think it’s essential to bring everyone to the Oak Grove site, to keep the team spirit here on the facility.”

“We need to do regular assessments and ask if we have the right talent mix. The positive side is that any organization in the world will envy us if our workforce variation is only 3 to 4%.”

In the attempt to create the right kind of environment for employees to succeed, Elachi stressed the success of the Research and Technology Development Program, the Director’s Research and Development Fund, and the Centers of Excellence. These areas are budgeted with competed, internal funding. Projected funding for these areas in FY ’03 is \$21 million, and Elachi pledged to increase the funding by \$10 million each year until it reaches about \$50 million.

Total investment funding, targeted toward all of JPL’s infrastructure, will see an increase of \$3 million in FY ’03, to \$58 million.

In discussing other institutional activities, Elachi noted the establishment of the new Senior A and Fellow grades. “It’s based on your interests, talents, capabilities and goals. If you get to the Fellow grade, you’ll be on the same level and salary range as a division manager.”

One of the benefits of the Senior A level is on-Lab parking, a hot Labwide issue that has gained a lot of attention. (Editor’s note: see the article in the Sept. 27 issue of Universe on the new parking policies.)

“I could have taken the easy way and said, ‘Let’s forget it,’ but that’s not my nature or the EC’s nature,” Elachi said. “This was not done lightly. When we see something is not fair, we need to try and improve it, even if we can’t make it perfect.”

To possibly create more parking spaces on Lab, Elachi said a master plan developed by Facilities includes searching for locations on Lab for parking structures. He said the Lab would consider the option of JPL staff paying for parking to finance the structures.

The director also touched on the following points:
AWARDS The process will be simplified, including reducing the number of awards, but the total budget is being increased by about 20 percent. There will be more emphasis on team awards.

KUDOS Elachi complimented the Travel Group for reducing their policies from 125 to 17 pages, and the Acquisition Division was lauded for its new Contract Purchasing System Review, under which contracts of \$25 million or more will be reviewed by NASA; formerly, contracts of \$1 million or more were so reviewed.

RESOURCES Appointments will be made this fiscal year for deputy project managers for resources, and a project financial practices document is being developed to complement an analogous JPL document for flight project practices.

FACULTY APPOINTMENTS “With Caltech, we are looking at ways of having long-term, joint appointments between the campus and JPL,” Elachi said. Preliminary discussions have also taken place with UCLA, and plans call for discussions with USC.

DIRECTORATE 300 REORGANIZATION

The EC was briefed in late September about a number of options, and director John Beckman will soon meet with section managers to get their inputs. If there are any changes they will be implemented in late fiscal ’03, probably next summer, after open discussion with the organizations involved.

HEALTH BENEFITS There will be an increase in the cost of health services next year. Also, an additional benefit will be offered for orthodontia for children.

TUITION REIMBURSEMENT Starting in January, undergrad tuition reimbursement will be increased from \$3,000 to \$5,250.

BUILDING DELAY Construction of the new project center was delayed to FY ’04 or ’05, due to budget constraints and the need for funds for Mars Exploration Rovers.

JPL FAMILY DAY “I was ecstatic,” Elachi said. “I hope you enjoyed it. We intend to do more events to recognize employees and teams. It’s important we all feel part of the JPL family. We really do care about each other.”

“I am proud and privileged to be your director,” he concluded. “All of us have done a superb job over the last year, but we need to—and we are going to—do an even better job over the next year, particularly in the area of cost management.”

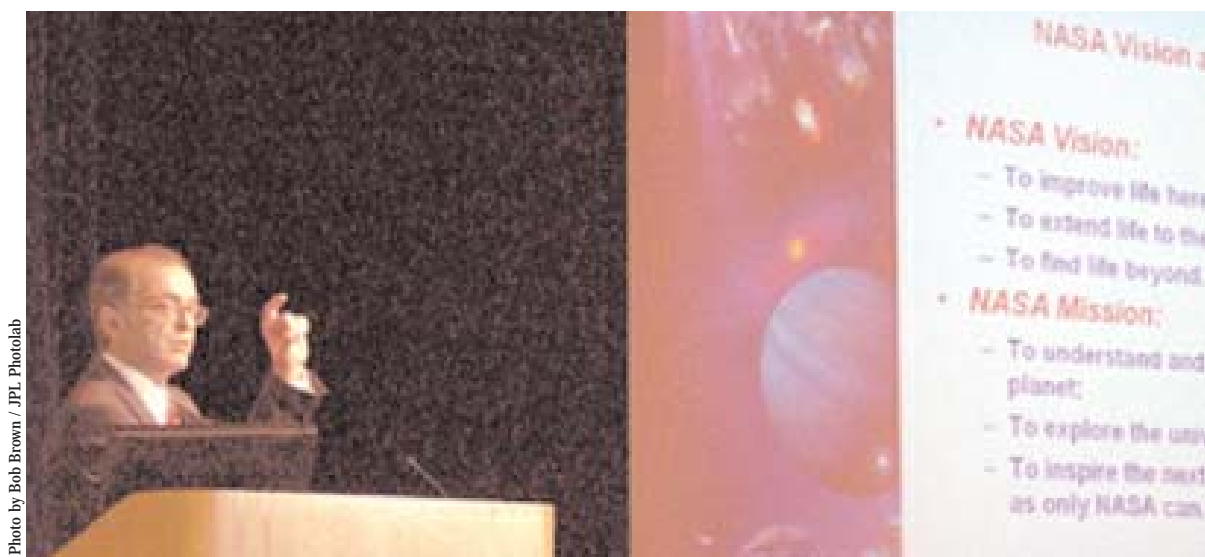


Photo by Bob Brown / JPL Photolab

Elachi added that calendar years 2003-04 would be the busiest period in JPL’s history, with 11 launches or encounters of spacecraft or major payloads in addition to the Mars landings.

Although the FY ’03 NASA budget has not yet been approved by Congress, the proposed NASA plan contains an upward stroke after a number of years of decline in the late 1990s. “We have about \$1.3 billion a year for the next five years, a significant part of which was won competitively,” the director noted. “So we have a very solid base to build upon.”

Elachi highlighted JPL’s recent success in acquiring new work via the competitive process. The Lab submitted four proposals for the In-Space Propulsion Technology Program, and three of them were selected. JPL submitted eight in collaboration with co-investigators; seven were selected. JPL proposals received \$12 million, or 32 percent of the \$38 million provided by NASA, in the competition open to NASA centers, universities and industry.

In addition, of the 14 national awards for the recent Advanced Component Technologies competition, JPL received six awards, representing 43 percent of the funding available.

Elachi also noted JPL’s recent acquisition of the Nanolaminate Mirror and Actuated Hybrid Mirror Program. “This technology is highly relevant to both the

Mailroom offers postal tips

FROM JPL MAIL SERVICES

Ever wonder why your mail is late in being delivered by the U.S. Postal Service? Take a look at the delivery address. If the address format is incorrect, or some of the address missing your mail will be delayed. Here are some guidelines for sending mail through the USPS as well as internal Lab mail.

The USPS is using more automated equipment and the need for correct addressing is very important. The Optical Character Reader (OCR) reads addresses from the bottom up & left to right. It prefers typed, upper case addresses, although with advancements in technology, the OCR can read some hand-printed addresses. If a piece of mail rejected by the OCR it takes longer to sorted manually.

Always provide a return name and mail stop on all your outgoing business mail. The U.S. Postal Service provides a mail-forwarding service to a recipient's new address, for which JPL is charged a fee. A Postal Service form is mailed back to the JPL Mail Center with the new address information. But, in order for the Mail Center to mail the new information to you, they need to know who sent it.

Letters

We want to thank our co-workers and the ERC for the kindness expressed at the recent passing of Arlene's mother. We were very touched by the plant and your kind words and cards.

Arlene and Harold Minuskin

Passings

PHILIP GWINN, 77, a retired illustrator in the former Section 648, died June 12.

Gwinn worked at JPL from 1967-82. Services were private.

Classifieds

For Sale

BATTERY BACKUP, for your PC/server, brand new American Power Conversion ES Series, model no. BE350U, \$25. 956-3745, Steve.

BEDROOM SET, romantic contemporary queen size pine headboard and footboard w/decorative iron work; matching 9-drawer dresser and detachable mirror; mint cond., includes box spring and mattress; see to appreciate; paid \$2,000 new, sacrifice at \$850/obo. 626/441-0338, Cynthia, eves.

BIKES: Huffly boy's, great cond., \$45; girl's \$15, 20-25; PLATES, porcelain collectible, \$30. 626/359-7666.

CAMERA, used Pentax K1000 with 28-210 zoom, case/strap, compact flash, good student camera, \$150/obo. 626/583-8232.

CEMETERY PLOTS (5), Rosehills Garden of Autumn; this garden is developed and plots are valued at \$2,100 each, sell for \$1,800/each; will sell each plot separately if necessary. 562/404-3464 x230, Janelle, betw. 7-4, or 909/986-4611 after 6 p.m.

CHAIR, overstuffed power recliner, La-Z-Boy luxury lift, off white upholstery (like new); remote lifts person out of chair, foot raises with remote; may need small elec. work; a must see; \$300/obo. 626/442-6361.

CHAIR, lady's Lazy Boy lift 1 year old, rose color, wooden arms, perfect condition, will accept best offer. 626/577-7818.

CLARINET, Yamaha YCL-20 resinite, gd playable cond., \$300 obo, list \$600. 952-8455.

COMPUTER, HP Jornada handheld PC, model 728, 64 MB RAM, 206 MHz strong arm processor, built-in 56 Kbps V.90 modem, full-size keyboard, 6.5" color screen, brand new in unopened box, will sacrifice, \$750/obo. 310/266-5460.

COMPUTER MEMORY, RAM for laptop, 64 MB PC100, \$20. albertobig@libero.it.

COUCH, large, clean, comfy, custom made w/plush pillows, \$500/obo. 468-8658.

COUNTRY CLUB MEMBERSHIP, Silver Lakes, Calif. resort, 4 wks. free golf each yr. at priv. PGA-rated course, 2-bd. condo, 2 beautiful lakes, many amenities, less than 2 hrs. from Pasadena, exchange rights w/3,000 resorts, illness forces sale, \$15,000. 805/967-7725.

DESK, oak, w/3 drawers & hutch, \$50, orig. purchased as bedroom furniture, gd. cond., \$50. 626/791-2464.

DRYER, gas, Whirlpool, old but works/looks good, \$75. 248-9708.

FISH TANK, 60 gal., w/stand and hood, acrylic, filters, pumps, heater, plants, etc.; take all for \$120. 353-4400, Brian.

FURNITURE: sofa, 91", black, \$100; bookshelf, ~30" wide, >6" tall, \$40; stereo component cabinet, glass doors, storage, barely used, \$50; sliding mirror closet doors, 2 doors cover up to 8' wide opening, ~5.5' tall, with track, \$30; pictures or info at john.oswald@alum.mit.edu.

FURNITURE: Spanish oak desk & 2 matching bookcases, \$700; mission sideboard w/mirror, \$1,200; mission library desk, \$400; Techline office furn. in white (6 pieces), \$500; drop leaf hall table, \$250; butcher block utility table, unfin., \$200; several mirrors, 2 Ikea golden oak bookcases, unopened, \$100; Spanish handmade rug, bright colors, \$250; orig. Nordic Track, \$50. 626/584-0860, Donna.

HALLOWEEN COSTUMES, assorted, exc. cond., \$5/each. 626/850-4378.

HEADBOARD (queen size, covered, half moon shape) with 2 matching shams, duvet cover, 3 pillows, and skirt; custom designed and almost new; tan & white with rust stripes on heavy cotton, \$600. 626/795-4856.

KEYBOARD, for Sony Web wireless; Sony Web TV remote; quick setup guide, reference card & smart card; exc. cond., selling to upgrade computer; all for \$100. 626/442-6361.

KEYBOARD AMP (with speaker), Fender KXR-100, exc. cond., has seen very little use, instructions and schematic provided, \$150/obo. 468-8756.

LOVE SEAT, leather, claret in color, brand new in package, no room to put it, newly bought from Robinsons May on 9/18 at \$1088 + tax, sell \$850; **RECLINER**, fabric, strip dark green, 3 yrs, \$120. 626/462-9597 or 626/298-1017.

MATTRESS, California King size, good condition, \$200. 626/850-4378.

MOVING BOXES, U-Haul, used once, xlg-5, lg-5, md-11, sm-9, ShortWardrobe-2, DishBar-rel-1; \$50 for all; see <http://www.uhaul.com/boxes/index.html>. 626/359-9991, James.

PHONE SYSTEM, Comdial Digital Impact SCS 24; includes: 4 line/8 station DCS II, 4-12 line LCD speakerphones, 1-12 line speakerphone, intergraded page interface, 2 wall speakers and 3 dropdown ceiling speakers & panels; \$850/obo. 626/301-9331, Eric.

PIANO, upright, needs TLC, \$300/obo. 661/266-9863.

PRINTER, Epson Stylus Color 880i, for PC or Mac, hardly used, \$40. 626/577-0068, Lou.

REFRIGERATOR, Hot Point 15.7, frost free, w/ice maker, white, \$100. 626/445-1013.

SPEAKERS, pair of 3 way, unfinished cabinets, excellent sound, 8-inch woofers, need new cones, \$30/obo. 500-0488.

TABLES: antique oak drawleaf table/w delicately carved base & 4 carved matching chairs; vg cond., \$800/obo; 2 antique Italian side tables/ end dark brown w/mahogany red leather top accentuated w/gold etching & small brass lion heads; \$300/pair/obo. 626/441-0338, Cynthia, eves.

TICKETS, San Diego Wild Animal Park, 4 adult @ \$20/ea., 2 children @ \$10/ea., must go. 661/269-0754.

TICKETS (2), L.A. Kings hockey, 16 rows from the ice, \$100/pair. 626/852-0821.

TILE SAW, w/Wet Diamond blade, exc. cond., MK470, cost \$300 new, used 6 days, \$200. 661/297-0219.

TRAMPOLINE, mini, \$50; **SEWING MACHINE**, Kenmore, \$50; both good cond. 248-6062, Elizabeth.

TREES, fish tail, 6' tall, \$80/obo; ficus, braided, in 30" plastic pot, >10' tall, \$250/obo; ceramic bowl, gray, 2' diameter with planted geraniums, \$40/obo. 626/791-6101.

TV, Magnavox 24" diagonal, gd. cond., \$80. 500-0488.

VIDEO CAMERA, SV8, 8mm Sunpack Ready-cam with carrying case; features include wireless controller, lens hood, sports finder, microphone, title features, manual/auto focus & zoom, \$100; Velbon tripod, \$35. 353-5671.

WICKER SCREEN, 3-panel, natural rattan, 72" high x 54" wide, \$60; **ELECTRIC TYPEWRITER**, Smith-Corona, with memory, \$50; **PLANT STAND**, indoor/outdoor, white coated metal, 29" high x 14" wide x 12" deep, still in box, \$10. 352-3112.

Vehicles / Accessories

'87 ACURA Int, 5 dr., 70K mi., 4-speed man, pwr. windows/doorlocks, cruise cont., am/fm/tape, tilt wheel, int. trunk & gas rel, low-mileage tires, original owner now disabled, all service records, beige ext, exc. cond., \$3,500/firm. 204-1255, leave number.

'97 CHEVROLET Cavalier, white, 2 door, a/c, driver and passenger air bags, 50,000 mi., excellent condition, \$5,790/obo. 949/654-7750.

'88 CHEVROLET Suburban Silverado 4x4, white, dual A/C, vg cond., bought 9 yrs ago from orig. owner, power windows, cruise control, 10 CD changer, \$4,000. 626/577-2882.

'00 COACHMAN Futura travel trailer, 28 ft, Model 2790TB; all welded alum. frame, very light (4,366 lbs.) for its length; slps 6, 2 bunks, queen bed; used less than 10 times; covered at all times; \$16,500. 661/255-7958, eves.

'94 DODGE Stealth R/T, white exterior, black interior, exc. cond., great running cond., 94,000 miles. 909/989-7563.

'00 HONDA Accord LX, 20,000 miles, \$11,800. 323/582-2109.

'98 HONDA Civic EX, 70K mi., black, sunroof, pwr. door locks/windows, tinted windows, alloy wheels, V-tec engine, stick shift, \$8K/obo. 310/384-2904.

When sending mail throughout the Laboratory please ensure that all mail has the correct mail stop, otherwise your mail could be sitting in the JPL Mail Center waiting to be hand processed in the "look-up" area. To avoid this, don't use room numbers, telephone numbers or just the building number with the floor number, e.g. 2nd floor. Also, print or write the full name of the recipient clearly. If you use a nickname (or middle name), be sure your mail is addressed to the correct mail stop. Correct information is available from the Perform address book or the Boss directory.

The Mail Center is notified of large personnel moves, but in most cases is not notified of individual moves. It is up to the individual to notify his/her section administrator of their new mail stop as soon as possible. If you receive mail for employees who have changed their address or have left the Laboratory, return the mail to the sender, advising them that this person is no longer at this address.

For more information on outside mail, check out the U.S. Postal Service home page at <http://www.usps.com>, and if you have any questions, contact the JPL Mail Center at ext. 4-2380 or 4-2381.

Free

CATS: Kitten rescued, needs permanent home, male, fluffy, pale gray Tabby, very playful, 12 weeks old, healthy, litter trained; Mama kitty, rescued, approx. 1 year old, short hair, gray Tabby named Pearl, very loving, healthy, litter trained. 626/287-9433.

CLEAN FILL DIRT, 30 cu. yds. avail., haul as little or as much as you like, near Los Robles/Jackson, Pasadena. 791-3103.

SATELLITE DISH, 8 ft., condition unknown, appears to be functional, you must remove from hillside in Whittier. 562/947-1670.

For Rent

ALTADENA, room in private home, walk to JPL, private bath and entrance, washer/dryer, kitchen privileges, \$600 + \$600 deposit. 626/794-4069.

ALTADENA, 1940s traditional, 3 bd., 1 full & (2) 1/2 ba., living room and detached studio/office, skylights and fireplace; refrigerator, stove, dishwasher, washer and dryer included; quiet neighborhood next to mtns. and hiking trails, less than 10 minutes from JPL; \$1,850, flexible lease. 323/309-8953, Marcia.

LA CANADA, 3 bd., 2 ba., family rm., gardener and pool service included, \$2,250. 790-2710.

LA CRESCENTA house above Foothill, 3 bd., 2 ba, 2 fp, new carpeting, stove, freshly painted inside and outside, newly landscaped, fenced backyard, 2 1/2 car garage, quiet cul-de-sac, no pets, \$2,250. 249-4146, Bob.

PASADENA, lg. condo, 1 bd., 1 ba., 2 blocks from Caltech, \$1,100. 626/396-1554.

PASADENA, spacious 2-story condo, 3 bd., 2.5 ba., prestigious community, beaut. inter., bright kitch., prof. landscape, ctrl. air & heat, close to shop., cozy l/r w/FP, end unit, frml. d/r. hdwd. flrs., immac. cond., close to schls, \$1,750. 626/396-9024.

SUNLAND, fully furn. rm in condo, share kitch./bath/laundry, garage parking, a/c, fireplace, pool, Jacz., tennis court; 10 miles to JPL; prefer upper classman/grad student, non-smoking; \$450 + security dep., references. 352-3112.

SYLMAR, rent to own, new 5 bd., 3 ba., 2-level view, Cameron Glen, \$10,000 credit toward buy after 1 year, 20 miles to JPL, \$2,295. 626/584-6526, Fred.

Real Estate

ARCADIA townhouse, quiet and clean, 3 bd., 2.5 ba. w/master suite, family rm., dining area, living rm., patio, cent. air/gas heating, 2-car attached gar., Arcadia schools, 7 yrs. old, 10 min. to JPL. \$319K. 626/294-0049.

LAKE TAHOE view from a beautiful 2-story, 2-bd., 2 ba., slps. 6; timeshare in Incline Village near Tahoe; Unit 36, Week 37; great time of year for annual Reno Air Races (if you're a fan), \$3,000. 562/404-3464 x230, Janelle, betw. 7-4, or 909/986-4611 after 6 p.m.

N. MONROVIA home, quiet cul-de-sac, 4 blks. north of Foothill, 3 bd., 2.25 ba., 1v. rm. w/vaulted ceiling & skylights, fireplace, din. room + breakfast nook, master suite w/dressing area/vanity, plenty closet space, 1,615 sq. ft., cent. heat/air, 2-car attached garage, new roof, beautifully landscaped, priv. back-yard, auto sprinklers, \$479K. 818/415-3814, cell.

Vacation Rentals

BIG BEAR LAKEFRONT, luxury townhome, 2 decks, tennis, pool/spa, beautiful master bd. suite, sleeps 6. 949/786-6548.

CAMBRIA, ocean front house, sleeps up to 4, exc. view. 248-8853.

HAWAII, Kona, ocean front on Keauhou Bay; house/guest house comfortably sleep 6; 3 bd., 2 ba.; rustic, relaxing, beautiful; swimming, snorkeling, fishing, spectat. vv., nr. restaurants, golf. other attractions. 626/584-9632.

HAWAII, Maui condo, NW coast, ocean front view, 25 ft. fr. surf, 1 bd w/loft, compl. furn. phone, color TV, VCR, microwave, d/w, pool, priv. lanai, slps 4, laundry fac., 4/15-12/14 \$105/nite/2, 12/15-4-14 \$120/nite/2, \$15/nite/add'l person. 949/348-8047, jackandrandy@cox.net.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, sleeps 6-8, fully equipped kitchen incl. microwave, D/W, cable TV, VCR, phone, balcony w/view to mtns., Jacuzzi, sauna, streams, fishponds, close to Mammoth Creek, JPL discount. 626/798-9222 or 626/794-0455.

OCEANSIDE, on the sand, charming 1 bd. condo, panoramic view, walk to pier & harbor, pool/spa, game rm., sleeps 4. 949/786-6548.

ROSARITO BEACH condo, 2 bd., 2 ba., ocean view, pool, tennis, short walk to beach on priv. rd., 18-hole golf course 6 mi. away, priv. secure parking. 626/794-3906, Patrick DeCarolis (retired).

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Universe is published every other Friday by the Office of Communications and Education of the Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA 91109.

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Ads are due at 2 p.m. on the Monday after publication for the following issue.

All housing and vehicle advertisements require that the qualifying person(s) placing the ad be listed as an owner on the ownership documents.

universe

Jet Propulsion Laboratory

October 25, 2002
Volume 32 Number 22

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Aircraft navigation sharpened

By Alan Buis

JPL's Ron Muellerschoen, right, demonstrated a factor of 10 improvement over current autonomous navigation systems.

Earth

JPL researchers have demonstrated the ability to very precisely navigate airplanes in real time, anywhere in the world, independent of local navigational aids or infrastructure. The breakthrough will not only benefit scientists, but promises to extend precision navigation to infrastructure-poor areas of the world, potentially enhancing aviation safety in these areas.

Ron Muellerschoen, lead architect of the NASA Global Differential Global Positioning System (GPS) at JPL, has demonstrated the ability of the system to achieve real-time aircraft positioning accuracy of 10 centimeters (3.9 inches) horizontally and 20 centimeters (7.9 inches) vertically, anywhere in the world—a factor of 10 improvement over current autonomous navigation systems. The system relays precise, real-time navigation data to specially equipped aircraft. The JPL team's results were presented recently at the Institute of Navigation System GPS 2002 Exhibit in Portland, Ore.

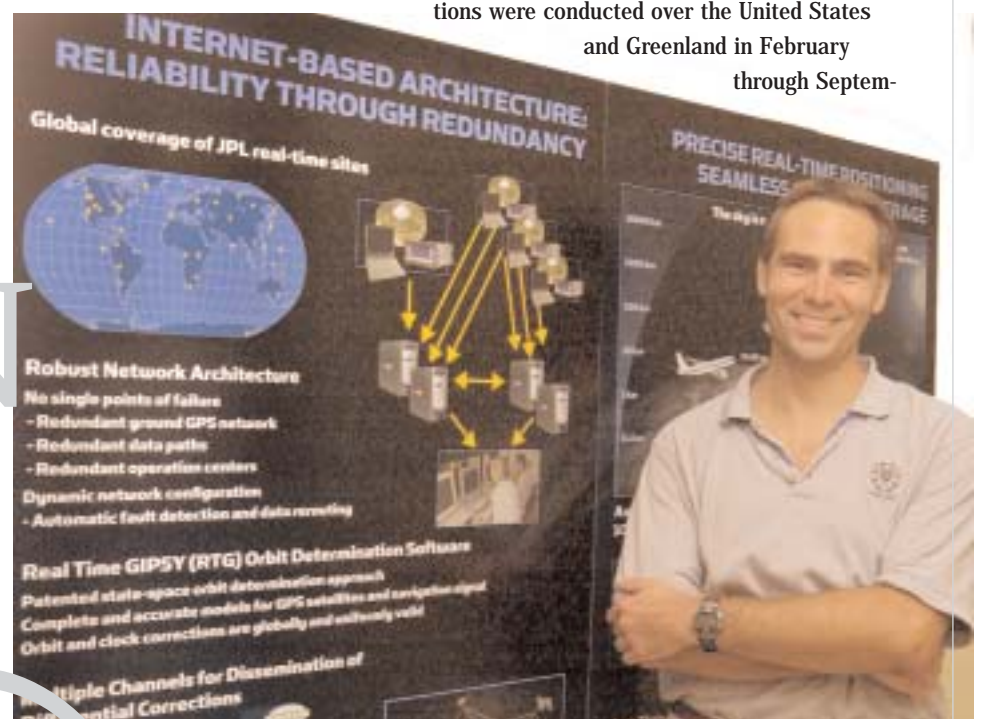
Although developed to improve the accuracy, efficiency and timeliness of Earth science missions, the technology's by-products may also include numerous civil and commercial applications in such areas as aviation safety, marine operations, land management, transportation and agriculture, said Dr. Yoaz Bar-Sever, the principal investigator for NASA's Global Differential GPS system at JPL. "Civil and commercial navigation services, currently only available within Earth's infrastructure-rich regions, could now be extended to any part of the world without lowering performance and with little to no marginal cost," he said.

Within the field of Earth science, Bar-Sever said, the technology would be used to develop better exploration techniques for Earth-observing instruments flying aboard aircraft and spacecraft. "The ability of Earth science instruments to precisely and autonomously know their position and velocity in real time is critical to many Earth-observing applications, including monitoring and responding to natural hazards such as earthquakes, volcanoes and hurricanes," he said.

JPL's Airborne Synthetic Aperture Radar Group has already used the precise real positioning from the Global Differential GPS system to improve the resolution of Earth images from NASA's aircraft-based Airborne Synthetic Aperture Radar instrument, said Group Supervisor David Imel, who envisions even greater use for the system in the near future. "For missions where an aircraft must fly exactly the same flight profile repeatedly, in order to sense subtle changes in the Earth from one flight to the next, the need for the extremely precise navigational accuracy that this system provides is critical," he said.

In space, precise onboard knowledge of position will improve the efficiency of a spacecraft's onboard data processing and reduce the time needed to transmit data to the ground. Bar-Sever and his team have already conducted successful demonstrations of decimeter-level real-time satellite positioning using data from NASA's Jason-1 spacecraft and the Argentinean Satellite de Aplicaciones Cientificas-C satellite. The team is currently developing a prototype payload to be flown aboard a spacecraft.

The NASA Global Differential GPS system flight demonstrations were conducted over the United States and Greenland in February through September



ber 2002 aboard a NASA Airborne Synthetic Aperture Radar DC-8 aircraft from NASA's Dryden Flight Research Center, Edwards, Calif., and a NASA P-3 aircraft from NASA's Wallops Flight Facility in Virginia.

Developed and operated by JPL since 1999 for NASA's terrestrial, airborne, and spaceborne science applications, NASA's Global Differential GPS system provides end-to-end capabilities for autonomous, real-time orbit determination and positioning at unprecedented levels of accuracy and availability. The system processes real-time GPS data from a global network of more than 30 dual-frequency GPS ground sites. It is the only system in existence that provides global, multiply redundant, real-time coverage of all GPS satellites, all the time. It routinely and automatically produces the most accurate real-time estimates of GPS satellite orbits and clocks, media calibrations and many other products and performance metrics. The system leverages NASA investments in the global GPS network and the U.S. government's investment in the Wide Area Augmentation System navigation technology developed at JPL.

More information about the Internet-based Global Differential GPS system is available online at <http://gipsy.jpl.nasa.gov/igdg>.

Photo by Richard Hasegawa / JPL Photolab

Changes noted for JPL award programs

JPL's Executive Council has approved several changes to the Laboratory's award programs. One of the most significant changes is a dramatic increase in the number of Team Member Bonus Awards. This award provides an opportunity to give monetary awards to team members. The number of team member awards will increase from 300 in fiscal year 2002 to about 1,000 in FY '03.

Additionally, the number of Spot Awards available to recognize individuals on an impromptu basis for special effort or high quality product or service will increase in numbers for FY '03. Last fiscal year, JPL allocated about 900 American Express Gift

Cheques valued at \$100 each; this fiscal year the number will increase to about 1,200.

The increase to both the Bonus and Spot Awards were made because of management's use of the programs as well as requests for additional awards at the local level and for teams.

Redirecting resources from the Award for Excellence Program, which has been discontinued, made these changes possible. Peer nominations, which are seen as valuable by the Lab population, will be continued through encouragement by management.

Another significant change involves the JPL Service Award Program. Recipients of the 10-, 15-, and 20-year service awards will now have their awards presented to them in a local setting by their management. This change was made to allow recipients a more meaningful and intimate setting to receive their awards. Recipients for 25 or more years (in five-year increments) will continue to be invited, along with their guests, to a luncheon hosted by JPL's executive management.

Please visit the Employee Services and Recognition website at <http://hr/esr> for more detailed information on these changes or on any other award program.

EMPLOYEE SERVICES & RECOGNITION

News Briefs



Thomas May

May receives minority honor

THOMAS MAY, manager of the JPL Business Opportunities Office (Section 264), received the 2002 outstanding Procurement Advocate award at the recent Minority Enterprise Development Week Awards.

The event is sponsored by the U.S. Small Business Administration and the Los Angeles Minority Business Opportunity Committee in recognition of outstanding achievements of minority-owned businesses and their public and private large business supporters.

May joined JPL in 1976 and has managed the Business Opportunities Office since 1981. He has earned both bachelor's and master's degrees from USC, with specialties in business and entrepreneur and venture management. Prior to joining JPL, May served as an inventory management specialist for the U.S. Air Force.

The Business Opportunities Office, a part of the Acquisition Division, serves as the liaison between JPL technical and acquisition representatives and the large, small and minority businesses that want to do business with JPL. This office has met or exceeded all goals for small and minority business participation under the Caltech/JPL prime contract in 2002 and prior years.

JPL and May have received numerous Small Business Administration and NASA awards in recognition of outreach efforts for small and minority businesses.

Payload takes balloon ride

A JPL balloon payload carrying a suite of instruments for measuring stratospheric chemistry was successfully flown at Ft. Sumner, N.M. on Sunday, Oct. 13.

The 1,100-pound (500-kilogram) payload included JPL's Ozone and Airborne Laser Infrared Absorption Spectrometer II (ALIAS II) instruments and a gas chromatograph from the National Oceanic & Atmospheric Administration's Climate Monitoring & Diagnostics Laboratory. Carried by a 4 million cubic-foot balloon, the payload reached an altitude of 105,000 feet (about 32,000 meters).

The measurements include gases that are sources of chlorine, as well as the resulting inorganic chlorine, so that the total chlorine content of the stratosphere can be assessed. The measurements also will help address questions regarding stratospheric dynamics and mixing between the stratosphere and lower atmosphere.

In addition to the instruments, JPL's ALIAS-II team and Balloon Support Group provided the gondola and instrument flight support. CHRIS WEBSTER (principal investigator), GREG FLESCHE and KATY MODARRESS comprise the ALIAS-II team; JIM MARGITAN (principal investigator) and BHASWAR SEN worked on the Ozone instrument; and JESS LANDEROS and RON HOWE comprise the Balloon Support Group. All are from Section 324.

Balloon flights are conducted by the National Scientific Balloon Facility.

Stardust asteroid flyby Nov. 1

Stardust will take advantage of flying near a small asteroid next month to test many procedures the spacecraft will use 14 months later during its encounter with its primary science target, comet Wild-2.

On Nov. 1, Stardust will pass within about 3,000 kilometers (about 1,900 miles) of asteroid Anfrank. The spacecraft will automatically image Anfrank using camera tracking of the asteroid as it speeds by at 7 kilometers (4 miles) per second.

"We have no science goals or science expectations at Anfrank," said Stardust Project Manager TOM DUXBURY. "It's an opportunity to try key procedures for the first time before we get to comet Wild-2. We may identify problems that we can address before we reach our primary target."

Anfrank is about 4 kilometers (2.5 miles) across. Given the flyby distance, that's too small for a picture that would show any surface detail. Also, the angle of the encounter relative to the Sun will give Stardust a view in which only a

thin crescent of the asteroid will be sunlit during approach, providing an additional challenge for the optical-navigation system to recognize it as a guiding light.

"This will be our most challenging event since launch," said mission manager ROBERT RYAN of JPL. "Our spacecraft team at Lockheed Martin is testing everything in the spacecraft simulation laboratory before we send the commands up to the spacecraft."

Stardust will bring samples of comet dust back to Earth in 2006 to help answer fundamental questions about the origins of the solar system. Additional information is available online at <http://stardust.jpl.nasa.gov>.

Rosetta shipped to launch site

Twenty instruments on the European Space Agency's comet-chasing Rosetta spacecraft, including three from NASA, are in final tests for launch early next year.

Launch from the Kourou spaceport in French Guiana is scheduled for a 19-day window beginning Jan. 13, 2003. Shipment to Kourou last month from the European Space Research and Technology Centre in Noordwijk, the Netherlands, followed more than 10 months of rigorous testing.

NASA is funding three research instruments and a key part of a fourth for the collaborative mission. NASA also provides one of the Rosetta's interdisciplinary scientists, DR. PAUL WEISSMAN of JPL, and support from JPL's Deep Space Network. "Rosetta is an ambitious mission with great international cooperation," said JPL's DR. CLAUDIA ALEXANDER, project scientist for the U.S. role in the mission. "We're eager to get it launched."

Rosetta will fly for nearly nine years before reaching its destination, comet Wirtanen, in November 2011. Then, as Rosetta orbits Wirtanen at distances as close as one kilometer (0.6 mile), the orbiter's instruments will examine how the comet changes while it moves closer to the Sun during the following 20 months. Rosetta will also drop a lander onto the surface of Wirtanen's icy nucleus. The NASA instruments will examine Wirtanen from the orbiter.

Rosetta carries more instruments than any other spacecraft in history. The orbiter's payload includes a camera, a microscope, spectrometers and an experiment to probe the comet's interior with radio waves.

JPL supplied the Microwave Instrument for Rosetta Orbiter, the first of its type for any interplanetary mission. This instrument can reveal the abundances of selected gases, their temperatures, the speed at which they're coming off the nucleus, and the temperature of the nucleus. Scientists will use it to monitor changes in how vapors are released from the nucleus as the coma and tail grow. JPL's DR. SAMUEL GULKIS is principal investigator.

Information about Rosetta is available at <http://sci.esa.int/rosetta>. For more on the microwave instrument, visit <http://mirowww.jpl.nasa.gov>.

Blood drive set for November

The next JPL/Red Cross blood drive will be held in von Kármán Auditorium on Tuesday, Nov. 12 from 10 a.m. to 4 p.m. and Wednesday, Nov. 13 from 7 a.m. to 1 p.m.

The Red Cross is currently experiencing a critical shortage of all types of blood, and their inventory continues to remain below desired levels.

Signup sheets are at Occupational Health Services (Building 310-202), and online at http://eis/medical/blood_form.html prior to the blood drive.

Last-minute signups may go directly to von Kármán at their preferred time. Be prepared to wait a little longer if you do not have an appointment.

To change your appointment, call the Pasadena Red Cross at (626) 397-9776.

For more information about blood donations, log on to http://www.redcross.org/services/biomed/blood_supply/tse.html.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meetings are available. Call the Employee Assistance Program at ext. 4-3680 for time and location.

Caregivers Support Group—Meets the first Thursday of the month at noon in Building 167-111 (The Wellness Place). For more information, call the Employee Assistance Program at ext. 4-3680.

Codependents Anonymous—Meeting at noon every Wednesday. Call Occupational Health Services at ext. 4-3319.

Gay, Lesbian and Bisexual Group—Meets the first and third Fridays of the month at noon in Building 111-117. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at ext. 3-0664.

Working Parents Support Group—Meets the third Thursday of the month at noon in Building 167-111 (The Wellness Place). For more information, call the Employee Assistance Program at ext. 4-3680.

Friday, October 25

Vienna Choir Boys—The choir will perform a program of costumed operettas, sacred songs, and secular and folk music at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$32, \$28 and \$24. For more information, call (626) 395-4652.

Saturday, October 26

"A Celebration of Caltech Science"—Emmy-award winning television journalist Charlie Rose will moderate two panel discussions from 9 a.m. to noon in Caltech's Beckman Auditorium. "The Brain" and "The Earth and The Universe" will be the topics of discussion. Admission is free and tickets are not required.

Altadena Old Fashioned Day Parade—JPL Director Dr. Charles Elachi is the grand marshal for the annual event, which celebrates the history of the community of Altadena and includes a day-long festival of family fun activities. Starting at 11 a.m. at Santa Rosa and Mariposa Streets, the parade heads east to Lake Avenue where it turns south and continues to Alameda Street.

Tuesday, October 29

"Making Data Make Sense: Accessing and Visualizing Very Large Data Sets"—Dr. Daniel Katz, supervisor of JPL's Parallel Applications Technologies Group, will speak from noon to 1 p.m. in conference room 167.

Wednesday, October 30

Caltech/JPL Flying Club—The fall membership meeting will be held at 7:30 p.m. in the 201 Bridge at Caltech. Guest speaker will be retired Skunkworks and SR-71 test pilot Robert Gilliland.

"Confessions of a 'Dot Com' Refugee"—Rich Fagen, director of information technology software support services at Caltech, will speak at this Caltech Management Association forum at 4:45 p.m. in von Kármán Auditorium.

"Safety-Critical Systems, Natural Language and Requirements"—Dr. John Knight, professor of computer science at the University of Virginia, will speak at noon in conference room 167.

Shout Hallelujah!—A musical variety show featuring song, dance and magic will be presented by the JPL Drama Club at 11:45 a.m. in von Kármán Auditorium.

Thursday, October 31

JPL Golf Club—Meeting at noon in Building 306-302.

JPL Stories—Dr. Mike Klein, manager of the Deep Space Network Science Office and former program manager for JPL's Search for Extraterrestrial Intelligence (SETI) program, will present "Ghostly Signals From Space: Stories From the SETI days at JPL" from 4 to 5 p.m. in the Library, Building 111-104. For more information, call Teresa Bailey at ext. 4-9233.

Friday, November 1

Caltech Women's Club—A welcoming coffee will be held at Avery Library from 9 to 10:30 a.m. Contact Carol Andersen for more information at (818) 790-8175.

Sat., Nov. 2—Sun., Nov. 3

Vandenberg Air Force Base Air & Space Show—Gates open at 8 a.m. for the event, which features aircraft fly-bys, demonstrations and performers, as well as exhibits of JPL missions launched from the base and other



NASA projects. Admission is free. For more information, visit <http://www.vandenberg.af.mil>.

Sunday, November 3

Chamber Music—The Berlin Philharmonic Wind Quartet will appear at 3:30 p.m. in Caltech's Beckman Auditorium. Tickets are \$29, \$25, \$21 and \$17. For more information, call (626) 395-4652.

Tuesday, November 5

JPL Gamers Club—Meeting at noon in Building 301-227.

JPL Genealogy Club—Meeting at noon in Building 301-271.

Wednesday, November 6

Associated Retirees of JPL/Caltech—Meeting at 10 a.m. at the Caltech Credit Union, 528 Foothill Blvd., La Cañada.

Thursday, November 7

Irish Poetry—Renowned poet Seamus Deane will appear at 8 p.m. in Caltech's Beckman Institute Auditorium. His topic will be "Politics and Culture in Modern and Contemporary Ireland." Admission is free. For more information, call (626) 395-4652.

JPL Gun Club—Meeting at noon in Building 183-328.

Friday, November 8

"What's the Color of Funny? Race, Society and Comic Strips"—Aaron McGruder, creator of the *Boondocks* comic strip, will speak at 8 p.m. in Caltech's Beckman Auditorium. Admission is free. For more information, call (626) 395-4652.



Aaron McGruder

Fri., Nov. 8—Sun., Nov. 10

Double Infidelity—The play by Mari-vaux will be performed by Theater Arts at Caltech Friday and Saturday at 8 p.m., Sunday at 2 p.m. Tickets are \$15. For more information, call (626) 395-4652.



Balloon carrying JPL payload is inflated at Ft. Sumner, N.M.

New Directions in SCIENCE

BY MARK WHALEN

Following a three-month transition period that ended in August 2001, JPL Chief Scientist Dr. Thomas Prince has been on the job for a little over a year now. Universe caught up with him to discuss how things are going, his goals and areas of emphasis.

W

hat attracted you to the job?

When Charles Elachi became JPL director in May of last year, he approached me and asked me to consider taking the position. The job appealed to me because it offered the opportunity to be very proactive in developing new directions and new research at JPL.

Any particular highlights stand out during the first year?

Yes. The major new item that has come online is the establishment of the Research and Technology Development Program. This has resulted in a significant increase in the funding available for investment in the future of research and technology. NASA worked with us on defining the program, which will allow us to progress from \$2 million in JPL research funding in fiscal year 2002 to \$10 million in 2003.

The success in this area is due very much to Charles' initiative, and there's been a great response to the program. For FY '03, we've received a large number of proposals, far exceeding the \$10 million available—about \$64 million worth of requests.



"The more innovative the ideas are, the more exciting it is to be in on the ground floor. I really enjoy helping other people achieve their individual aspirations."

Another new direction we're going

is to initiate new collaborative efforts with universities and other outside research organizations. We will be investing more in these collaborations using the Director's Research and Development Fund program, especially at the early stages. Being the best includes collaborating with the best and we need to keep on the cutting edge by forming strong research partnerships with top-notch research efforts outside of JPL.

Another key development over the last year is the establishment of our Science and Technology Management Council, where a chief scientist and chief technologist represent each Lab directorate. Among other activities, the Council oversees the Research and Technology Development Program funding and the Lab's Centers of Excellence Program.

The Science and Technology Management Council did not exist before

last year, so this is the first time that a science and technology group has had such high management visibility. It's been very enjoyable to watch the Council come together as a group and begin to help develop the strategy for science and technology at JPL.

What are the chief scientist's roles and responsibilities?

What are your goals?

I view my job as helping JPL to achieve its objective, which is excellence in space exploration. I'm interested in the new directions, programs, technologies, and new science that we can initiate. I'll be working with Erik Antonsson, the new chief technologist, to identify key areas and increase our research investment in these areas.

There's an interesting story associated with your coming to JPL.

Tell us how it all came about.

Well, I came to Caltech from the University of Chicago in 1979 as a post-doc, to start collaborative work with a gamma-ray astronomy group at JPL. I came from a lab at the University of Chicago that had three professors, each of whom eventually sent one of their graduate students to become a professor at Caltech. One was Robbie Vogt (a previous JPL chief scientist); one was Ed Stone, the retired JPL director; and the third was myself. All three of us started at the same lab at the University of Chicago; we all ended up at the same Space Radiation Laboratory at Caltech. Eventually, we all took on roles in the JPL management.

Since coming to Pasadena, I have worked with JPL on a number of joint activities. While on campus I worked collaboratively with the Lab on super-computing, and also worked jointly with JPL on Medium-class Explorers (MIDEX) proposals. More recently, I shifted research directions and became interested in gravitational waves. Immediately before becoming chief scientist here, I took a position at JPL as the U.S. mission scientist on the Laser Interferometer Space Antenna (LISA) Project. With LISA, we're building an instrument that has the prospects of looking back to the first fraction of a second of the beginning of the universe.

What do you enjoy most about your job? What has been the most exciting thus far?

One of the very enjoyable parts of my work is just sitting down with the scientists and technologists here and learning what they do.

Another part is helping to identify new and innovative ideas, and helping the people who have those ideas make them into reality. And the more innovative the ideas are, the more exciting it is to be in on the ground floor. I really enjoy helping other people achieve their individual aspirations.

More broadly, the work that's done here at the Laboratory in the planetary, Earth science, and astrophysics areas is all just very exciting. Recently, I spent a very enjoyable half-hour over at the Spacecraft Assembly Facility and just watched them integrating the Mars Exploration Rovers. To just see a project like that coming together so quickly is amazing.

If a science student asked you what he or she could gain or contribute working at the Lab in the future, how would you answer?

JPL is unique, in the sense that it combines the flavor and tradition of Caltech research with the ability to do exceedingly hard and technically challenging large space projects. Very simply, we undertake space exploration in a way that no other organization can. That's why students come here. For students interested in really being part of the cutting edge of space exploration, there's no better place than JPL.

The Universe is moving

As of Oct. 28, the Universe

office will be relocated to

Building 111-B29C,

directly across the street

from the JPL Store.

The phone number for Universe

remains the same:

ext. 4-6089.

View this and previous issues of Universe online <http://universe.jpl.nasa.gov>

Universe

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Universe is published every other Friday by the Office of Communications and Education of the Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA 91109.

Notice to Advertisers

Advertising is available for JPL and Caltech employees, contractors and retirees and their families. No more than two ads of up to 60 words each will be published for each advertiser. Items may be combined within one submission. Ads must be submitted on ad cards, available at the JPL Store and the Universe office, Bldg. 111-B29C, or via e-mail to universe@jpl.nasa.gov.

Ads are due at 2 p.m. on the Monday after publication for the following issue.

All housing and vehicle advertisements require that the qualifying person(s) placing the ad be listed as an owner on the ownership documents.

Food drive on; United Way kickoff Oct. 31

A kickoff celebration for this year's JPL United Way Campaign, "Bridging the Gap, Making a Difference," will be held on Thursday, Oct. 31, at noon on the mall, in conjunction with a Halloween fashion show. A \$5.50 barbeque lunch special will be offered at the Armadillo Grill, of which 50 cents per meal will be donated to United Way by Caltech Dining Services.

Those participating in the costume fashion show will receive a coupon for 10 percent off one item at the JPL Store. All winners will be entered in a drawing to win two tickets to Disneyland (donated by the JPL Store).

Last year, United Way of Greater L.A. raised \$65 million, including \$450,000 from JPL's campaign. Beginning Oct. 31, campaign representatives in each JPL organization will begin contacting employees about participation. The campaign will run through Nov. 22. For more information, see JPL's United Way website at <http://hr/unitedway>, or call Nancy

Letters

I would like to thank all my wonderful friends, colleagues, Section 381 and JPL for the kind words, support and prayers after the passing of my grandfather early this year and during the recent passing of my grandmother. My family and I were very touched by the beautiful cards and flowers.

Rosanna Sumagaysay-Aouda

My family and I wish to thank my friends and co-workers in the SIRTF Project Office, Acquisition Division and ERC for your support and help in my hour of deepest sadness for the recent passing of my son. Though I know more should be said, further words of gratitude escape me at this time.

Kirk Bilby and family

We would like to thank our co-workers and the ERC for the thoughtful card and plant that we received on the death of Doug's father. The donations to the Alzheimer's fund were greatly appreciated. Thank you all for the kindness shown.

Doug and Bonnie Shepard

Passings

LAWRENCE KOSS of Section 280 died Sept. 7. He worked at JPL for 16 years, and is survived by wife Lexuan and sons John and Daniel.

CHARLES CRAWFORD, retired from Section 673, died Sept. 14. Crawford worked at the Lab for 19 years. He is survived by his wife, Amelia, and two daughters.

JACK WHITEHEAD, retired from Section 351, died Sept. 14. He is survived by his daughters, Laura and Sherry.

MARSHALL TROUT, retired from Section 662, died Sept. 16. He is survived by his wife, Lyllus.

GEORGE BARBANI, retired from JPL after 38 years of service, died Sept. 18. He is survived by his wife, Norma, daughter Linda, son Mark, and four grandchildren.

Retirees

The following JPL employees retired in October: Charles Bryant, 40 years, Section 333; Robert Hall, 40 years, Section 352; Paul Batelaan, 37 years, Section 386; Minnie Perry, 34 years, Section 344; Clara Thoms, 29 years, Section 273; Alan Harris, 28 years, Section 323; Vincent Escobedo, 23 years, Section 662; Robert Emmons, 22 years, Section 215; John Repar, 21 years, Section 352; Suzanne Craig, 18 years, Section 381.

Classifieds

For Sale

AUTOHARP, 15-chord Chromaharp, exc. cond., \$225. 323/255-5220, Toni.
BEACH CRUISER, red, gd cond., \$30. 6/850-4378.
BIKES, boys, Huffly, \$45; girls, \$15, both vg cond.; CHAIN SAW, gas, \$50; COLLECTOR PLATES, 20-25, porcelain, \$30. 626/359-7666.
BIKE RACK, Hollywood for mini-van, 4 bikes, exc. cond. \$40; IN-LINE SKATES, Variflex, men's sz. 7, women's sz. 9, never used, \$35. 626/574/9664.
BIKE RACK, new, \$15. 626/254-0886, after 6.

BLOCK YARD SALE, 2100 Oakdale St., Pas., betw. Del Mar/San Pasqual & Allen/Craig, near Caltech, Sat., Nov. 2, 9 a.m.-3 p.m., furn., dishes, toys, linens, tools, misc. 626/795-5235.

BOOKS, complete works (or nearly) of Louis L'Amour, 115 hard bound, great for frequent flyer, \$300 or about \$2.50 per. 626/355-0123.

CALCULATOR, Texas Instruments TI-59 programmable w/PC-100C print cradle (incl. roll of paper), Master Library Solid State Software mod-ule (no battery pack, no documentation), has magnetic card reader but no cards, incl. TI Math-ematics Specialty Packet booklet, calculator/print cradle verified to work, \$50. tcfs@aprelx.com.

CEMETERY PLOTS, 5, at Rosehills, Garden of Autumn on developed land, willing to sell each plot separately if necessary, valued at \$2,100/ea., sell for \$1,800. 909/986-4611, eves.

CHRISTMAS TREE, evergreen, long needles, good cond., 7 ft. high, full, stand, lasts forever, \$40. 626/445-6677, after 6 p.m.

CLIMBER, Little Tykes SwingAlong, for ages 1-3 yrs, swing and slide, like-new cond., pur-chased for \$120, sell for \$90. 626/850-4378.

COFFEE MAKERS, Krups 10-cups, white/gray, like new, \$40/obo; Braun 10-cups, white/black, like new, \$30/obo. 626/791-6101.

COMPUTER, laptop, 20 GB hard drive, Fujitsu MHM2200AT 9.5mm (slim), \$120. altatension@hotmail.com.

COMPUTER, Compaq, with monitor, Pentium P-400, 128M RAM, CD-ROM, new 56K Intel modem, \$395. 951-0000, Nik.

COMPUTER DESK, ample storage and place for printer/CPU. 243-8255.

COUNTRY CLUB MEMBERSHIP, Silverlakes, Calif., resort, golfer's dream, 4 wks free golf each year at priv. PGA-rated course with driving range/putting greens, 2-bd. condo for up to 6, 2 lakes, many amenities, less than 2 hrs. from Pasadena, exch. rights w/3,000 resorts, reduced to sell due to illness, \$15,000. 805/967-7725.

DINING SET, table, rectangular, white-washed oak, burl-top, Bernhardt with six chairs, 2 with arm rests, 2 unused leaves to expand table to sit 8 people, exc. cond., cost \$1,800 new, sell for \$800/firm. 626/577-2882.

DINING TABLE, beautiful, lg. w/matching china set, also incl. 2 lg. sofas + coffee table, all furn. is beige, only 1 yr. old, hardly used. 353-9859.

DINING TABLE, mahogany stained Ponderosa Maple, 2 Duncan-Phyfe pedestals w/brass claw feet, rnd corner top w/custom glass top, from 1940s, 40" x 60", photo at JPL Store, \$450/obo. 626/296-3782.

DOG HOUSE, wooden, for medium dog, great cond., \$40. 952-8032.

ENTERTAINMENT CENTER, cabinet, gd. cond., 2' x 2' x 5' high, blond wood w/smokey glass, 4 shelves w/bottom drawer for CDs/DVDs, \$100. 626/445-6677, after 6 p.m.

EXERCISE APPARATUS, Weider, multi-station, exc. cond., \$150. 626/355-0123.

FIELD TRIPOD, heavy-duty, model Paragon HD-F2 from Orion, tri-braced alum.\tube legs, quick-release 1/4"-20 dovetail shoe, convertible cushion/spike ft, built-in bubble level, incl. polyester/nylon case, only used once, \$90/obo. 323/268-6645.

FISH TANK, 50 gal., w/new stand, incl. all pumps, filter systems, etc., \$175. 626/405-9701.

FURNITURE: bdrm suite, Victorian style in oak by Lexington, kn. bed w/footboard and 6' headboard; dresser, 9 drawer w/spindle mirror; lingerie chest w/mirror; 2 washstands; sm. writing desk, all in gd cond., set is 10 yrs. old and still mfd. today, picture avail. via e-mail, orig. pd. over \$4,000, sell \$2,000. 909/948-0049.

FURNITURE: desk, Spanish oak, + 2 matching bookcases, \$700; mission sideboard w/mirror, \$1,200; mission library desk, \$400; office furn., Techline, in white, 6 pieces, \$500; hall table, drop leaf, \$250; butcher block utility table, unfinished, \$200; sev. mirrors; 2 Ikea golden oak bookcases, unopened, \$100; rug, Spanish, hand-made, bright colors, \$250; NordicTrack, original, \$50. 626/584-0860, Donna.

FUTON PAD, full-size, good cond. \$25; BIKES, 2, 10-speed, 19" & 21", good cond., \$15/ea; MITER SAW, \$5. 626/574-9664.

LEATHER JACKET, ladies, size 2, black, lined, w/ belt, new, \$100; OVERCOAT, men's London Fog, w/thermal liner, sz. med. hardly worn, beige, \$75. 760-3326 or bogusboo@hotmail.com.

MAGAZINES, Sky & Telescope, 1960-92, 1 missing issue, \$350; Smithsonian Astrophysical Observatory Star Catalog & Atlas, 4 volumes, \$100. 952-0408.

MISC: living rm set, 3-pc., leather; steamer trunk w/glass tabletop; cordless phone; cell phone; torchiere lamp; Earthlink home networking router. 626/818-3460.

MISC: recliner, teal, \$49; peacock chair, wicker, \$29; Shiatsu massager, fits in chair, \$39; spare tire, donut, T105 80D-13, \$49; baby crib, maple, \$29; stroller, \$19; microwave cart, solid oak, \$39; side table, oak, \$19; wedding gowns, size 5/6, \$159, size 3/4, \$99; mini blinds, 72" w x 50", 2 for \$29; doorbell/intercom, wireless, \$39; quilting frame, \$29; Imation external SuperDisk drive for Mac, \$49. 626/798-4510.

PC/SERVER BATTERY BACK-UP, brand new, American Power conversion ES series, model no. BE350U, \$28. 956-3745, Steve.

Kapell, ext. 4-9432, or Laurie Lincoln, 4-1612.

The annual United Way food drive is underway and continues through Nov. 22. Last year, JPL staff donated enough food to help feed more than 1,500 families. Participating agencies are Duarte Community Service Council, El Monte/South El Monte Emergency Resources, Foothill Family Services, Pacific Clinics, and Glendale Community Center of Catholic Charities. Suggested items for food donations include canned items such as meats, fruits, vegetables, soup and stew, and dried foods such as cereal, coffee, flour and sugar. Food donations can be placed into barrels at the following locations: Building 114-104, JPL Store; 177, dispatch office; 180, 1st floor lobby; 180, 2nd floor entrance; 183, 3rd floor elevator; 190 cafeteria; 198-105; 230, guard desk; 238, lobby; 241-208, travel reservations; 281, credit union; 301, 2nd floor; 303, lobby; 306, lobby; 601, guard station.

Food or cash donations will be accepted at the kickoff celebration.

POOL TABLE, 8 ft., incl. light bar, cue stick rack, waterproof cover, all playing accessories, 10 mo. old, rarely used, like new, \$995. 626/405-9701.

REFRIG./FREEZER, Kenmore, 25.8 cu. ft., side-by-side, 18 yrs. old, grt. cond., \$325. 259-5526.

SAMPLE SALE, Oshkosh B'Gosh kids' clothing, salesmen's samples, less than wholesale, Sat., Oct. 26, 8 a.m.-2 p.m., 3525 McNally Ave., Altadena, N. of Loma Alta, 1 block E. of Fair Oaks. SOFA, makes to qn. bed, abstract black, blue & mauve design, gd cond., \$300; BICYCLES, 4, children's, fair cond., \$10/ea.; LADDER, aluminum, \$50. 626/357-8210.

TELESCOPE EQUIPMENT: Meade 12" LX 200 with computer drive system (Smart Drive), Apogee AP47P digital imaging system, comprising a TE cooled camera head with Grade 1 Marconi 47-10 CCD and MaxIm DL/CCD image acquisition and processing software, Meade Super Wedge and Dew Shield, plus other additional accessories, virtually unused, paid \$13,000 sell \$9,750. 805/492-0576, ts44@gte.net, Tony. TREES, fish tail, 6' tall, \$80/obo; ficus, braided, in 30" plastic pot >10' tall, \$250/obo; CERAMIC BOWL, gray, 2' diameter with planted geraniums, \$40/obo. 626/791-6101.

WASHER AND DRYER, \$80/ea. 626/584-1164.

YARD SALE, 4 family, Nov. 2-3, 8 a.m. to ?, clothes, toys, books, misc., lots of great items, 3350 N. Bartlett Ave., Rosemead, off 10 fwy.

Vehicles / Accessories

'79 CADILLAC DeVille, drives well, good tires, passed 2002 smog test, cruise, tilt wheel, \$700. 626/254-0886, after 6 p.m.

'93 CHRYSLER Town & Country, white, 7-pass, auto, new shocks & ABS, roof rack, chains, great family car, 116K mi., \$4,900/ obo. 549-1594, Pascal.

'00 FORD Mustang GT conv., silver w/black top, loaded, leather, 36,000 mi., exc. cond., \$18,000/ make offer. 805/660-4226.

'99 FORD Taurus, beautiful cond., loaded, low mi. 72,000, \$5,995. 626/379-3503, Erik.

'99 FORD Taurus wagon, metallic silver, great spacious family car, 12-valve V6 3.0L eng., 79K mi., exc. cond., \$8,300/obo. 626/584-1164.

'98 FORD Windstar, 6 cyl., 3.8L, gold/lt. brown int., low 46K miles, power windows/locks, alarm, am/fm/cass. stereo, 10-disk CD changer, exc. cond./cond., \$9,400/ obo. 661/254-3147.

'68 FORD Mustang Classic Calif. Special, GT/CS, hi-per 302 cid, 75K orig. mi., auto, fac. a/c, PS, AM radio, metallic gold paint, black interior. GT hood, trunk, fogs and wheels, no rust, manuals, turns heads. \$13,250/obo. 626/963-5727.

'91 HARLEY-DAVIDSON Sportster 883, 19K mi., black, oil cooler, belt drive, good condition, \$4,600/obo. 661/254-8012.

'98 HONDA Shadow ACE deluxe motorcycle, 750 cc, green/cream, great cond., extr. well maint., some extras, 51K mi., \$4,250/obo. 293-0599.

'97 HONDA Accord EX, p/s, p/b, moon roof, CD, alarm system, loaded, new brakes, 112K mi., runs great, \$9,500/obo. 661/718-8483.

'97 HONDA Valkyrie motorcycle, exc. cond., very clean, many extras, chrome parts, garage kept, 23,000 mi., leather bags. 957-2852.

'85 HONDA Accord sedan, good cond., well maintained, 4 door, automatic, white w/blue interior, 167K mi., \$1,850. 626/914-7853.

'96 JEEP Grand Cherokee Laredo, 65K mi w/ext. warranty to 75K, 2WD, V6, single owner, \$9,000/obo. 626/862-3477.

'85 KOUNTRY Lite 5th wheel trailer, 30 ft., orig. owner, alum. frame, 13.5K a/c, side bath, microwave, TV/VCP avail, new tires & water pump, sleeps 6, exc. cond., renewed lic.-Mar. \$7,200/obo. 626/963-5727

'95 MERCEDES-BENZ S420, exc. cond., 59K miles, black/tan, loaded, solid/smooth ride, \$28,000/obo. 249-9747.

'95 PONTIAC Bonneville, exc. cond., V6, fully powered, a/c, pdl., pw etc., forest green, tan interior, 98,000 mi., all service records, great car for \$5,200/obo. 790-0875.

'96 SAAB 900S, dk. green w/beige interior, 87M, orig. owner, exc. cond., all maint. records, 5 speed, a/c, factory stereo, alloy wheels, \$7,900/obo. 310/306-7319, Mike.

'98 SATURN SL2, 68K mi., silver, a/c, am/fm/cass., vg cond., \$6,300. 626/355-5631, Tim, after 5:30 p.m.

'01 TOYOTA Corolla, exc. cond., only 22K mi., 5 spd, silver, alloy wheels, CD, a/c, pwr. everything, all dealer service, great, reliable, fun to drive, \$12,450. 626/396-1945, lv msg.

'99 TOYOTA Camry, 30,000 actual mi., exc. cond., \$13,000. 248-6762.

'01 VOLKSWAGEN Beetle GLS, silver/black leatherette, 5 spd, pwr. locks/windows/mirrors, cruise, alloys, AM/FM cass, CD changer, fog lights, ABS, remote keyless entry, 11.5K mi., \$16K. 626/449-0997.

'96 VOLVO 960 wagon, top of the line, exc. cond., all auto, a/c, leather int., heated leather seats, 6 disc CD/cass., all power, moon roof, 3rd seat, no accidents, white/gray, 97,000 mi., \$12,000. 626/296-3441.

Free

CAT, cute, cuddly, 8 year-old male Tabby, fixed, friendly, never bitten or scratched anyone, terribly healthy, loves playing w/people & dogs, but doesn't get along w/cats, loves outside but sleeps on your toes at night. 626/395-1908, Charlie.

CATS, 2, beautiful, adult male Siamese, lt. brown, 7 yrs, front claws removed; adult female, brown, tortoise shell, 5 yrs., both have shots and are spayed/neutered. 769-8468, after 8 p.m.

CAT, gray Tabby kitten, med.-length hair, litter trained, healthy, very playful, friendly; mother cat also needs a home, 1 yr old. 626/287-9433.

RUBBLE ROCK, about a pickup truck bed worth, unearthed from Foothill area, various sizes and colors but mostly gray/black. 957-7623 or erik@hovland.org.

Wanted

HOUSING, JPL employee, older single man, no pets, no smoke, needs small apt. or cottage near JPL for weekdays only. 393-7368.

SHARP ZAURUS ZR5000, must be in working order. 323/662-4089.

SPACE INFORMATION/memorabilia from U.S. & other countries, past & present. 790-8523, Marc Rayman.

TOY WAGON & WOODEN BLOCKS, used, to buy, in gd cond., for 1-2 yr. old. 626/351-8643.

For Rent

ALTADENA, room, kitchen priv., share ba., washer/dryer, pool, \$400. 626/345-0692.

GLENDAL, furn. room, share cable, utilities, and complete house privileges, cent. courtyard w/fountain, deck w/gazebo, ba. with garden view, no smoking or drinking, \$650. 246-4750.

MONTRROSE, lg. 1-bd. apt., 10 minutes from JPL, \$695. 626/445-0884, John.

PASADENA, spacious 2-story condo, 3 bd., 2.5 ba., prestigious community, beaut. inter., bright ktch., prof. landscape, ctrl. air & heat, close to shop., cozy 1/2 w/FP, end unit, frml. d/r, hdwd. flrs., immac. cond., close to schls, \$1,750. 626/396-9024.

PASADENA, 3 bd., 1 ba., garage, stove and fridge provided, no smoking, no pets, 1754 Corson St., drive by, pick up brochure, then call for appointment, \$1,490. 626/798-4510.

TEMPLE CITY, back house, 2 bd., 10 mins from JPL, no pets, one person, stove, fridge, micro incl., very clean, \$1,000. 626/795-3608.

Real Estate

INCLINE VILLAGE, Lake Tahoe view from a beautiful 2 story, 2 bd., 2 ba., sleeps 6, time-share, unit 36, week 37, great time of year for annual Reno Air Races, \$3,000. 562/404-3464 x230 or 909/986-4611, after 6 p.m., Janelle.

Vacation Rentals

BIG BEAR LAKEFRONT, luxury town home, 2 decks, tennis, pool/spa, beautiful master bd. suite, sleeps 6. 949/786-6548.

CAMBRIA, ocean front house, sleeps up to 4, exc. view. 248-8853.

COSTA RICA, Pueblo Real, Quepos, 2 bd., 2 ba., condo, fully equipped kitchen, TV, VCR, sleeps 6, air, newly remodeled, large pool, tennis, typical restaurant, nr Manuel Antonio, next to river w/ mangroves and monkeys, close to beach, JPL rates. luisalfaro@earthlink.net or 760/723-8522.

HAWAII, Kona, ocean front on Keauhou Bay, house/guest house comfortably sleep 6, 3 bd., 2 ba.; rustic, relaxing, beautiful; swimming, snorkeling, fishing, spectac. vw, near restaur-ants, golf and other attractions. 626/584-9632.

HAWAII, Maui condo, NW coast, ocean front view, 25 ft. fr. surf, 1 bd. w/loft, compl. furn. phone, color TV, VCR, microwave, d/w, pool, priv. lanai, slps 4, laundry fac., 4/15-12/14 \$105/nite/2, 12/15-4/14 \$120/nite/2, \$15/nite/ add'l person. 949/348-8047, jackandrandy@cox.net.

LAKE TAHOE condo, N. Shore, 2 bd., 2.5 ba., sleeps 6, all amenities, convenient location, walk to shuttle to local ski areas, 2 miles to casinos, avail. by the week only during holidays, 4-day min. rental all other times, special JPL discount. 626/355-3886, Rosemary and Ed.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, slps 6-8, fully equip'd ktch. incl. microwave, D/W, cable TV, VCR, phone, balcony mtn. vw., Jacuzzi, sauna, streams, fishponds, close to Mammoth Creek, JPL disc. 626/798-9222 or 626/794-0455.

OCEANSIDE condo, fully furn., 2 bd., 2 ba., fireplace, full kitchen, quiet, relaxing, beautiful beachside setting; BBQ, pool, spa, game room, great ocean view; easy walk to pier/restaur-ants, slps 8, avail. weekly or monthly. 909/ 981-7492 or dhaugie@yahoo.com, Darlene.

OCEANSIDE, on the sand, charming 1 bd. condo, panoramic view, walk to pier & harbor, pool/spa, game rm., sleeps 4. 949/786-6548.

PARK CITY, Utah, 12/17-12/24, 1 bd., sleeps 4, fully furn., w/kitchen, indoor pool/spa, 3 world-class ski resorts, shopping, restaurants, night life, 40 mi. from SLC airport, \$600. 897-1203.

ROSARITO BEACH condo, 2 bd., 2 ba., ocean view, pool, tennis, short walk to beach on priv. rd., 18-hole golf course 6 mi. away, priv. secure parking. 626/794-3906.